

WE CLAIM:

1 A system for locating a circuit interrupter associated with a selected branch
circuit from amongst a plurality of circuit interrupting devices, each circuit interrupter
5 within said plurality of circuit interrupting devices being operably connected in series
between a power line bus bar and a respective branch circuit, each branch circuit having a
hot lead and a neutral lead, said system comprising:

- a receiver broadly tuned about a predetermined frequency of a current spike
signal created on said selected branch circuit by a passive transmitter, said receiver driving
10 a user-perceivable signaling device upon sensing said current spike signal; and

- said passive transmitter creating said current spike signal on said selected
branch circuit at said predetermined frequency upon operable connection to said selected
branch circuit, said current spike signal having a sufficiently short spike duration and a
sufficient amplitude so as to substantially minimize development of a sympathetic signal
15 on other branch circuits adjacent to said selected branch circuit, said passive transmitter
including a voltage controlled switch in series with a charge storage device;

- whereby said receiver detects said current spike signal solely when in
proximity to said circuit interrupter associated with said selected branch circuit as said
current spike signal on said selected branch circuit is easily distinguished from said
20 sympathetic signal developed on any of said other branch circuits.

2. The system of Claim 1 wherein the voltage controlled switch is constructed
to conduct upon application of a voltage in excess of a breakover voltage across said
voltage controlled switch; whereby upon said voltage controlled switch conducting,
25 current flows through said charge storage device, causing said charge storage device to
charge and instantaneously developing a current spike signal on selected branch circuit.

3. The system of Claim 2 wherein the voltage controlled switch is a SIDAC.

4. The system of Claim 2 wherein the charge storage device is a capacitor.

5. The system of Claim 1 wherein the passive transmitter further includes a diode in series with said charge storage device; whereby said passive transmitter creates a current spike during only one half cycle of an alternating current flowing through said hot lead of said selected branch circuit.

5 6. The system of Claim 1 wherein the passive transmitter further includes means for creating a current spike during only one half cycle of an alternating current flowing through said hot lead of said selected branch circuit.

7. The system of Claim 1 wherein the passive transmitter further includes a discharge circuit in parallel with said charge storage device whereby said voltage controlled switch blocks current flow once a voltage across said voltage controlled switch falls below a minimum holding voltage, causing said charge storage device to discharge an energy stored in said charge storage device through said discharge circuit.

8. The system of Claim 7 wherein said discharge circuit includes a resistor.

9. The system of Claim 7 wherein the discharge circuit has an impedance such that the discharge circuit and the charge storage device form an RC circuit having a time constant, said time constant determined in relation to a desired number of said current spikes created in relation to cycles of the alternating current.

10. The system of Claim 7 wherein said discharge circuit includes a signal device whereby said signal device produces a cue in response to an energy discharge from said charge storage device.

11. The system of Claim 10 wherein said signal device is a light emitting diode.

12. The system of Claim 1 wherein the passive transmitter further includes means for producing a user-perceivable signal in response to a current spike being created by an associated charge storage device.

13. The system of Claim 1 further including a plurality of subcircuits, each one of said plurality of subcircuits having a voltage controlled switch and a charge storage

device; whereby at least one of said plurality of subcircuits creates said current spike on said selected branch circuit.

14. The system of Claim 13 wherein a firing subcircuit from the plurality of subcircuits is determined by a wiring scenario of an electrical receptacle to which said passive transmitter is connected; wherein said firing circuit creates said current spike on said selected branch circuit.

15. The system of Claim 1 wherein said passive transmitter further includes a plurality of indicator means for providing an indication that an electrical receptacle to which the passive transmitter is connected is wired in accordance with a predetermined arrangement.

16. The system of claim 15, wherein the plurality of indicator means comprises a plurality of light emitting diodes.

17. The system of claim 16, wherein the plurality of light emitting diodes is illuminated in combination to indicate a wiring condition selected from the set of wiring conditions consisting of:

- correct wiring;
- open ground;
- open neutral;
- reversed polarity;
- hot on neutral with open neutral; and
- unenergized circuit.

18. The system according to Claim 1 wherein said receiver includes:

- a microcontroller;

- an HF pulse detector circuit tuned to said predetermined frequency of said current spike signal generated by said passive transmitter on said selected branch circuit; said HF pulse detector circuit operably connected to said microcontroller;

- a user perceivable signaling device operably connected to said microcontroller; and

- a power supply operably connected to said microcontroller;

whereby said user perceivable signaling device is driven in response to said HF pulse detector circuit sensing said current spike signal.

19. The system according to Claim 18 further including a field detector circuit for detecting a predetermined alternating current signal, said field detector circuit operably connected to said microcontroller;

20. The system of Claim 19 wherein said field detector circuit detects a 60Hz signal.

21. The system of Claim 19 wherein said field detector circuit detects a 50Hz signal.

22. The system according to Claim 18 wherein said signaling device includes a visual signaling device and an audible signaling device, each of said visual signaling device and audible signaling device being operably connected to said microcontroller

23. The system according to Claim 1 wherein said current spike signal has a spike duration no longer than about 10 microseconds.

24. A passive transmitter for use in a system for locating a circuit interrupter associated with a selected branch circuit from amongst a plurality of circuit interrupting devices, each circuit interrupter within said plurality of circuit interrupting devices being operably connected in series with a power line bus bar and a respective branch circuit, each branch circuit having a hot lead and a neutral lead, said passive transmitter creating a current spike on said selected branch circuit, said passive transmitter comprising:

- a voltage controlled switch constructed to conduct upon application of a voltage in excess of a breakover voltage across said voltage controlled switch; and

- a charge storage device in series with said voltage controlled switch;

whereby upon operable connection to said selected branch circuit, said voltage controlled switch is triggered into conductance by application of a voltage in excess of a breakover voltage across said voltage controlled switch, allowing current to flow through said charge storage device; causing said charge storage device to charge and instantaneously developing a current spike signal on selected branch circuit, said current spike having a predetermined frequency and a sufficiently short spike duration so as to

substantially minimize development of a sympathetic signal on other branch circuits adjacent to said selected branch circuit.

25. The passive transmitter of Claim 24 wherein the voltage controlled switch is a SIDAC.

5 26. The passive transmitter of Claim 24 wherein the charge storage device is a capacitor.

10 27. The passive transmitter of Claim 24 further including a discharge circuit in parallel with said charge storage device whereby said voltage controlled switch blocks current flow once a voltage across said voltage controlled switch falls below a minimum holding voltage, causing said charge storage device to discharge an energy stored in said charge storage device through said discharge circuit.

28. The passive transmitter of Claim 27 wherein the discharge circuit includes a resistor.

15 29. The passive transmitter of Claim 28 wherein the discharge circuit has an impedance such that the discharge circuit and the charge storage device form an RC circuit having a time constant, said time constant determined in relation to a desired number of said current spikes created in relation to cycles of the alternating current.

20 30. The passive transmitter of Claim 24 further including a diode in series with said charge storage device; whereby said passive transmitter creates a current spike during only one half cycle of the alternating current.

31. The passive transmitter of Claim 24 further including means for creating a current spike during only one half cycle of the AC wave.

25 32. The passive transmitter of Claim 27 wherein the discharge circuit includes a signal device in parallel with said charge storage device whereby said signal device produces a cue in response to an energy discharge from said charge storage device.

33. The passive transmitter of Claim 32 wherein said signal device is a light emitting diode.

34. The passive transmitter of Claim 24 further including means for producing a user-perceivable signal in response to a current spike being created by an associated charge storage device.

5 35. The passive transmitter of Claim 24 further including a plurality of subcircuits, each one of said plurality of subcircuits including a voltage controlled switch and a charge storage device; whereby at least one of said plurality of subcircuits creates a current spike on said selected branch circuit.

10 36. The system of Claim 35 wherein a firing subcircuit from the plurality of subcircuits is determined by a wiring scenario of an electrical receptacle to which said passive transmitter is connected; wherein said firing circuit creates said current spike on said selected branch circuit.

37. The passive transmitter of Claim 24 further including a plurality of indicator means for providing an indication that an electrical receptacle to which the transmitter is connected is wired in accordance with a predetermined arrangement.

15 38. The passive transmitter of claim 37, wherein the plurality of indicator means comprises a plurality of light emitting diodes.

39. The passive transmitter of claim 38, wherein the plurality of light emitting diodes is illuminated in combination to indicate a wiring condition selected from the set of wiring conditions consisting of:

20 correct wiring;
open ground;
open neutral;
reversed polarity;
hot on neutral with open neutral; and
25 unenergized circuit.

40. A method for locating a circuit interrupter associated with a selected branch circuit from amongst a plurality of circuit interrupting devices, each circuit interrupter within said plurality of circuit interrupting devices being operably connected in series between a power line bus bar and a respective branch circuit, each branch circuit having a
30 hot lead and a neutral lead, said method comprising:

(a) operably connecting a passive transmitter to a selected branch circuit, said passive transmitter having a voltage controlled switch in series with a charge storage device;

5 (b) creating a current spike on the selected branch circuit at a predetermined frequency;

(c) inducing only a substantially weak electromagnetic field about the selected branch circuit by limiting the current spike signal to a sufficiently short duration;

10 (d) placing a receiver broadly tuned about the predetermined frequency of the current spike signal in physical proximity to each of the plurality of circuit interrupting devices individually; and

(e) driving a user-perceivable signaling device when the receiver is coupled to the weak electromagnetic field generated at the predetermined frequency of the current spike signal.

15 41. The method of Claim 40 further including indicating that an electrical receptacle to which the transmitter is connected is wired in accordance with a predetermined arrangement.